

The Life Cycle of Stars

Nebulas

Beginning of stars

Starts as a ball of gas (hydrogen) and dust

Gravity pulls the gas and dust together in a sphere

As the star gets denser, it gets hotter

The hydrogen turns to helium gas

Different types of stars

Type is based on size, mass, brightness color, temperature and age

Stars can change types throughout their life

Main Sequence Stars

The second stage of a star's life after it was formed

Energy is created and released during this phase

Red Giants

The third stage for most stars

The star expands and cools after it uses all of its hydrogen

The inner layer of the star shrinks but its atmosphere

Expands 10 times the size of the sun

Super Red Giant

Can be formed as a red giant's atmosphere expands

100 times the size of the sun (massive stars only)

White Dwarfs

The final stage of a star's life

Has about the same mass as the sun

The left over center of an old star

Cannot produce any more energy

Can shine for a billion years

Sun

Took 10 million years to become a main sequence star

Has been shining for 5 billion years

Will use all of its hydrogen and become a red giant in 5 billion years

H.R. Diagram

A graph used to show a relationship between a star's temperature and brightness and how the star has changed over time

When stars get old

Average Stars

Become red giants and then white dwarfs

Massive Stars

Massive Blue Stars use a lot more energy and burn more hydrogen than other stars.

This makes them live shorter lives than other stars

At the end of their lives, they can explode in a large bright flash that can be brighter than an entire galaxy called a **Supernova**

After the supernova occurs, the materials left over are squeezed together to form a new star.

The particles in the star's core are forced together and they form neutrons. This is called a **Neutron Star**.

Neutron Stars that spin are called **Pulsars**.

Pulsars send beams of radiation towards Earth

Black Holes

Sometimes the remains of a supernova are so massive that they collapse into a **Black Hole**.

No light can escape its gravity because it is so Massive. Locating them is difficult